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10/576,729	01/04/2007	Robert John Davies	15111.0065	4364

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STEPTOE & JOHNSON LLP
1330 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

EXAMINER	
WALLENHORST, MAUREEN	
ART UNIT	PAPER NUMBER
1797	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,729	DAVIES ET AL.	
	Examiner	Art Unit	
	Maureen M. Wallenhorst	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/21/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

2. The abstract of the disclosure is objected to because the abstract from the corresponding PCT application should be placed on a separate sheet. Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities: On page 6, lines 3-4 of the specification, the description of Figure 4 should include a description of figures 4a and 4b since the drawings depict a Figure 4a and 4b. On page 14, line 14, a Figure 8 is mentioned. However, the drawings do not depict any Figure 8.

Appropriate correction is required.

4. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite and incomplete since the claim fails to recite that the detection of either the presence of particles at a predetermined location or the movement of particles through a predetermined location in the fluid serves as an indication of coagulation in the sample. See this same problem in claims 3, 4, 9, 11 and 13.

On line 2 of claim 4, the phrase "at one zone of a container" should be changed to --at one zone of said container-- so as to positively refer to the container recited earlier in the claim.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 6 and 9-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Adler (US 3,650,698, submitted in the IDS filed on April 21, 2006).

Adler teaches of a method and apparatus for the automatic determination of the coagulation of a blood sample. The apparatus comprises a film substrate 66 containing measured quantities or spots 70 of a dried suspension disposed at equally spaced intervals on the upper surface of the film. The dried suspension contains opaque particles of a paramagnetic material such as magnetic iron oxide particles. Photosensitive detection means 88 comprises a light source 94 and light detection means 96. A light beam will be focused by a focusing lens 92 for impingement upon a mirror 78 and a plasma sample disposed on a spot 70 of the film 66, and reflection of light from the sample will be refocused by the focusing lens 92 for impingement on the photoelectric detection cell 96. A bar magnet 100 rotates at an appropriate rate to establish a rotating magnetic field. In operation, a blood plasma sample dispensing probe 120 will dispense a sample of blood plasma to a spot 70 on film 66. The combination of the plasma sample with the spot 70 causes the immediate re-suspension of the magnetic particles. The rotating magnetic

field caused by rotation of the bar magnet 100 causes the mixing and movement of the magnetic particles within the sample. A reagent such as thromboplastin to initiate coagulation is then dispensed onto the sample on the film 66. Each of the particles will be caused by the action of the magnetic field to rotate about its own axis and to rotate about the center of the mixture to significantly promote the blood plasma-thromboplastin reaction. As the coagulation proceeds, the polymerization of the fibrinogen in the blood sample into fibrin strands will result, and these fibrin strands are collected by the rotating particles. The fibrin strands become interwoven until such time as they are collected by the magnetic particles into one or more large globules or agglomerates to indicate that the reaction end point or blood plasma coagulation has taken place. Initially, the mixture of the blood plasma sample and magnetic particles is turbid or opaque due to the substantially even distribution of the magnetic particles therein. However, as coagulation proceeds to the end point, the interaction between the fibrin strands and the magnetic particles to form large globules and agglomerates results in the rapid and dramatic change in the optical characteristics of the mixture, wherein the fibrin-magnetic particles are collected in the center of the mixture to result in a sharp change in the light transmission properties from substantially turbid or opaque to substantially transparent or translucent in the area outside of the center. The change in the turbidity of the mixture is detected by the photoelectric cell 96 through the sharp and dramatic opening of the light path for the beam of light from the light source 94 to the cell 96. At this point, a signal is given to stop a timer and the timer records the coagulation time of the blood plasma sample. See Figures 1-5, lines 8-23 in column 5, lines 10-31 in column 6, lines 1-17 in column 9, lines 48-75 in column 10 and lines 1-26 in column 11 of Adler. Therefore, Adler teaches of a method and apparatus for detecting coagulation of a fluid comprising

providing a magnetic field to cause particles to move within the fluid, illuminating the fluid and optically detecting the presence and movement of the particles through a predetermined location in the fluid, wherein the predetermined location is a location away from the center of the sample where the complexes of magnetic particles and bound fibrin strands coagulate. When the magnetic particles no longer move in the location away from the center of the sample, this indicates that coagulation has occurred and the magnetic particles are bound up among the fibrin strands at the center of the sample.

8. Claims 1 and 6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Oberhardt (US 5,110,727, submitted in the IDS filed on April 21, 2006).

Oberhardt teaches of a method and apparatus for performing coagulation assays. The device comprises a laminate structure having a plurality of layers, as depicted in Figure 16 of Oberhardt. The middle laminar layer 20 comprises a sample chamber and channeling for introduction of a sample into the sample chamber. The method of using the device to detect coagulation of a blood sample comprises the steps of adding a blood sample to be assayed to the flat surface of the laminar device. The flat surface contains a mixture of magnetic particles and a dry reagent such as thromboplastin for initiating coagulation. Upon introduction of the blood sample into the laminar device, the magnetic particles and reagent are re-suspended. The mixture is subjected to an oscillating magnetic field, a moving permanent magnetic field or a combination of the two, and the movement of the magnetic particles is monitored in order to detect coagulation. The magnetic particles situated on the flat surface 500 of the device aggregate into columnar aggregates 701 and 702. These aggregates are caused to change between orientation states 701 and 702 by the oscillating magnetic field to create what appears to

be a "flicker" or periodic fluctuations between bright and dim reflected or scattered light. Therefore, under the influence of either the oscillating or the moving permanent magnetic field, the magnetic particles aggregate to form cylindrical or columnar shapes which undergo an approximately 90° change in orientation to produce bright and dim reflected or scattered light. Figure 8 in Oberhardt illustrates a flat surface 500 of the laminar device charged with a combination of reagent and magnetic particles 501 and an oscillating magnetic field generating means 506. A decrease in the movement of the magnetic particles identifies the coagulation time of the sample. Oberhardt teaches that the magnetic particles are either paramagnetic or superparamagnetic. See Figures 1a, 1b, 5 and 13-16, lines 3-18 in column 4, lines 26-44 in column 7, lines 4-58 in column 11, lines 25-68 in column 18 and lines 40-49 in column 19 of Oberhardt. Therefore, Oberhardt teaches of a method and apparatus for detecting the coagulation of a sample comprising providing a magnetic field to cause particles to move within the fluid, illuminating the fluid and optically detecting the movement of the particles through a predetermined location in the fluid. Although the magnetic particles are attached to the flat substrate of the device and move only through a 90° orientation, the light source still detects such movement in the sample and when this movement stops as a result of coagulation of the sample.

9. Claims 1-5 and 8-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Martinoli et al (US 4,918,984).

Martinoli et al teach of a method and device for measuring the coagulation time of a blood sample. The device comprises a transparent cup 1 containing a ferromagnetic ball 2 or particle therein. The diameter of the ball 2 is slightly less than the width of the cavity 3, and a travel path 4 is formed in the cup 1 by a groove 5 in the bottom of the cup 1. On each side of the

travel path 4 are placed, outside the cup 1, two magnetic poles 6a and 6b which terminate a magnetic carcass 7 in the form of a U, each leg of which is surrounded by a coil 8a, 8b. An optical system is also located in proximity to the cup 1 and comprises a light emitting diode 9 on one side of the cup and a receiving photodiode 10 on the other side of the cup. The corresponding light beam 12 extends so as to be substantially tangential to the ball 2 when the latter is at the lowest point of its travel path. To use the device taught by Martinoli et al, a plasma sample and reagents that initiate coagulation are introduced into the cup 1. A current is fed alternately into coils 8a and 8b so that ball 2 executes on its travel path a pendular movement close to its natural oscillation period. When the blood coagulates, the amplitude of the oscillations decreases suddenly, and the coagulation time of the sample is determined at the moment when this occurs. The optical system detects when the movement of the magnetic particle 2 through its highest point of travel in the travel path 4 stops as an indication of blood coagulation. The light beam 12 is tangential to the particle 2 when it is at the lowest point of its travel path 4. The result is that the particle 2 partially occludes the light beam 12 when it moves away therefrom, with the maximum occlusion taking place when the particle 2 reaches its highest point in its travel path 4. When the light beam 12 is no longer occluded by the particle 2 at its highest point of travel in the cup 1, this indicates that the particle 2 is no longer moving in the sample due to coagulation. Martinoli et al teach that the both the frequency and intensity of the external magnetic field are adjustable. See Figures 1-2, columns 2-3, lines 63-68 in column 4, and column 5 in Martinoli et al. Therefore, Martinoli et al teach of a device and method for detecting coagulation of a blood sample comprising a container for the sample and magnetic particles in the container under the influence of a magnetic field, a magnetic arrangement for

sequentially providing a first magnetic field on one side of the container and a second magnetic field on an opposite side of the container, a light source for illuminating the container, and a detector for detecting optical radiation from the light source after passing through the container, wherein the detector detects the presence of the magnetic particles at a predetermined location (i.e. the highest point of travel of the particles along the travel path 4) in order to determine the coagulation of the sample.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 6-7, 15-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martinoli et al (US 4,918,984) in view of Oberhardt (US 5,110,727). For a teaching of Martinoli et al and Oberhardt, see previous paragraphs in this Office action.

Martinoli et al fail to teach that the magnetic particles in the cup 1 are either paramagnetic or superparamagnetic, fail to teach that reflected light can be used to determine when the movement of the magnetic particles stops as an indication of coagulation, and fail to

teach that the cup can be replaced with a laminar structure to which the magnetic particles are introduced. However, based upon the combination of Martinoli et al and Oberhardt, it would have been obvious to one of ordinary skill in the art at the time of the instant invention to use either paramagnetic or superparamagnetic particles as the magnetic particles in the device taught by Martinoli et al since Oberhardt teaches that such particles are useful for determining the coagulation time of blood by determining the time at which paramagnetic or superparamagnetic particles stop moving under the influence of a magnetic field, which is the same technique used by Martinoli et al to determine blood coagulation. It also would have been obvious to one of ordinary skill in the art to use reflected light to determine when the movement of the magnetic particles in the cup taught by Martinoli et al stops as an indication of coagulation since Oberhardt teaches that both scattered and reflected light are useful for indicating when magnetic particles in a fluid stop moving. It also would have been obvious to one of ordinary skill in the art to replace the cup taught by Martinoli et al with a laminar structure to which the magnetic particles are introduced since Oberhardt teaches that blood coagulation assays based upon detecting when the movement of magnetic particles in a blood sample stops can be performed using laminar structures defining one or more sample chambers and channels for introduction of fluids thereto, and the substitution of one known element (i.e. a laminar structure) for another (i.e. a cup) would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

13. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martinoli et al in view of Oberhardt as applied to claims 6-7, 15-16 and 18-20 above, and further in view of Howell et al (US 7,305,896). For a teaching of Martinoli et al and Howell et al, see previous paragraphs in this Office action. Martinoli et al fail to teach that the cup can be replaced with a

laminar structure to which the magnetic particles are introduced, and fail to teach that the laminar structure has a notch at one end for sample application.

Howell et al teach of a capillary fill test device that can be used to measure blood coagulation. The device comprises a laminar structure comprised of multiple layers having sample chambers and channels therein. One layer of the device comprises a sample-receiving chamber that includes an inlet end such as a notch that opens onto two surfaces of the device. This geometry provides an easy target for a user to position the source of fluid, such as a pricked finger expressing a drop of blood, onto the device. The device facilitates the delivery of liquid for an assay to performed, such as blood coagulation. See Figure 1, lines 20-28 in column 2, lines 24-31 in column 4 and lines 26-37 in column 5 of Howell et al.

Based upon the combination of Martinoli et al, Oberhardt and Howell, it would have been obvious to one of ordinary skill in the art to replace the cup taught by Martinoli et al with a laminar structure to which the magnetic particles are introduced for the reasons given above, and to further provide a notch at one end of the laminar structure for sample application since Howell et al teach that a notch at one end of a laminar structure provides an easy target for a user to position a sample of blood onto the device in order for the coagulation of the blood to be measured in the device.

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Please make note of: Girolami, Seitz et al, Rousseau, Martinoli et al (US 5,072,610), Mintz, Kloth et al, Howell et al (US 2008/0026476) and Wright et al who all teach of different devices and methods for measuring the coagulation time of blood samples.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen M. Wallenhorst whose telephone number is 571-272-1266. The examiner can normally be reached on Monday-Thursday from 6:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden, can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Maureen M. Wallenhorst
Primary Examiner
Art Unit 1797

mmw

January 16, 2009

/Maureen M. Wallenhorst/

Primary Examiner, Art Unit 1797